

## Formal Education

### STUDENT SUPPORT



**Student support** includes enrichment activities, such as brief courses, summer workshops, and hands-on science education experiences, which expose students to Earth system science subjects and processes. It also includes research opportunities through programs that provide direct financial assistance and fellowships, as well as research and training at NASA facilities and universities. These programs are providing opportunities for students at all education levels to develop new skills, gain experience working with researchers, and to learn first-hand about Earth system science careers and research.

## ELEMENTARY & SECONDARY

### ● Access Earth

<http://accessearth.usm.maine.edu>

**Access Earth** is a program for high school students with disabilities and teachers to encourage students with disabilities to enter careers in Earth system science. Students and teachers attend an intensive week-long summer institute focusing on land-ocean-atmosphere interactions, with field activities based at the Wells National Estuarine Research Reserve on the coast of Maine. Topics to be covered include climate change and sea level rise, land use changes, atmospheric

pollution, and coastal watershed management. Participating teachers will work with scientists, educators, and students with disabilities to develop, test, and refine accessible Earth system science curriculum. Students will work with scientists, collecting and analyzing scientific data, and will learn about career opportunities in Earth system science.

In 2002 the institute will be offered from July 19 through July 26 for high school science teachers and from July 21 through July 26 for high school students with disabilities. The program is limited each year to 10 teachers and 15 students from Maine, New Hampshire, and Vermont. High school teachers of Earth science, general science, or environmental science are especially encouraged to apply, but applications will be accepted from other disciplines. Students should be entering ninth or tenth grade.

Participating teachers are expected to further test and refine curriculum in their classrooms during the school year. Course materials and room and board are provided. Teacher participants receive a \$500 stipend upon successful completion of the institute.

**CONTACT:** Nancy Lightbody, College of Education and Human Development, University of Southern Maine, 301C Bailey Hall, Gorham, ME 04038; *Phone:* 207-228-8115; *Fax:* 207-780-5224; *Email:* [nancy@lightbody.org](mailto:nancy@lightbody.org)

### ● Aeronautics and Earth Science Academy

The mission of the Medgar Evers College (MEC) **Aeronautics and Earth Science Academy (AESA)** is to provide under-represented middle and high school students an enriched academic experience that involves various areas of NASA's strategic enterprises, including Earth Science, Space Science, and Aeronautics and Space Transportation Technology, and thus encouraging these students to pursue careers in science, mathematics, engineering, and technology (SMET). The goals are to: 1) strengthen students' mathematics, science, computer, and communication skills; 2) integrate research and related activities into their academic experiences so that students will be encouraged to enroll in SMET college preparatory courses; 3) give students the confidence and desire to pursue SMET careers; 4) encourage parental involvement and support of students in learning SMET; and 5) increase the number of under-represented students in the SMET pipeline. These students receive a variety of SMET-based experiences, including the following classes or workshops: Air Pollution, Water Pollution, Learning and Exploring Science with the Internet, Career Exploration in Science and Technology, Global Warming, Introduction to the Internet, Weather Analysis, Earth Science, Basic Social Skills, and Writing Skills/Newsletter

Development. Parents are encouraged to join the Parent Café and participate in science and technology conferences held at MEC.

The AESA program is held after school during the academic school year during a six-week period on Saturdays, from 9:00 am to 12:30 pm. During the summer, the program is in session Monday through Thursday from 10:00 am until 1:30 pm.

**CONTACTS:** Leon Johnson, Department of Physical, Environmental and Computer Science, Medgar Evers College of the City University of New York; *Email:* lpjohnson@mec.cuny.edu—or William Harris, AEL Project Director; *Email:* wharris@mec.cuny.org

### ● **Ames Aerospace Encounter**

<http://encounter.arc.nasa.gov>

NASA Ames Research Center hosts fourth, fifth, and sixth grade classes in an interactive, hands-on program, entitled the **Ames Aerospace Encounter**. Located in a renovated supersonic wind tunnel, the Aerospace Encounter involves students in activities focused around four topics: aeronautics, space science, Space Station, and Mission Control/Earth science.

In the Mission Control/Earth science section, children work with a variety of scientific information collected by aircraft and spacecraft. The Earth system science tutorial features images of Earth taken from aircraft and satellites. The students find their way from space to Moffett Field, California by identifying specific geographic features in remotely-sensed images. In Aeronautics, students learn about the principles of flight and wind tunnels, and use computers to design airplanes. In the Space Sciences section, they experience some of the basics of

physics in fun physical ways. Young people become astronauts on a simulated space station with different experiments to complete.

The Ames Aerospace Encounter is free; groups are accepted on a space-available basis for this popular program.

**CONTACT:** Ames Aerospace Encounter, Mail Stop 226-1, NASA Ames Research Center, Moffett Field, CA 94035-1000; *Phone:* 650-604-1110.

### ● **Challenger Center for Space Science Education**

<http://www.challenger.org>

**Challenger Center for Space Science Education** is an international, not-for-profit education organization created in 1986 by the families of the astronauts tragically lost during the Challenger space shuttle mission. Using space exploration as a theme, Challenger Center's highly acclaimed programs inspire students to pursue math, science, and technology studies, while at the same time helping them develop critical life skills.

The organization launched the Challenger Learning Center Network in 1987. Learning Centers use technology-rich educational environments to create hands-on and minds-on learning experiences. They offer a variety of programs, from mission simulations for students to professional development workshops for instructors. Each year, more than 400,000 students visit Challenger Learning Center sites across the United States, Canada, and the United Kingdom.

There are four mission scenarios offered at Challenger Learning Centers. Encounter Earth, Voyage to Mars, Return to the Moon, and Rendezvous with a Comet allow students to rev up their imaginations and transform themselves into astronauts, scientists,

and engineers. The scenarios meet or exceed National Science Education Standards, and were developed with NASA engineers and scientists to ensure an authentic experience.

Mission scenarios and fees vary by location. Log on to [www.challenger.org](http://www.challenger.org) for the Challenger Learning Center nearest you.

**CONTACT:** Challenger Center for Space Science Education, 1250 North Pitt Street, Alexandria, VA 22314; *Phone:* 703-683-9740; *Fax:* 703-683-7546.

### ● **Chesapeake Bay Watershed Initiative**

<http://destiny.mbhs.edu/cbwi>

**The Chesapeake Bay Watershed Initiative (CBWI)** is a Mid-Atlantic Space Grant Consortia initiative involving K-12 students. Utilizing a hydrology-based scientific experiment, students determine if possible causes and effects of changes in nutrient levels in tributaries of the Bay can be correlated with weather phenomena and/or remotely-sensed changes in land cover or use.

Teams of students with varying levels of expertise measure, code, and electronically report in situ observations of water quality, compile weather information, and analyze Landsat satellite imagery to investigate nutrient changes in time and space. Code and observation forms are transportable nationwide.

**CONTACT:** Anne Anikis, Assistant Director, Maryland Space Grant Consortium, The Johns Hopkins University, Bloomberg Center for Physics and Astronomy, Room 203, 3400 N. Charles Street, Baltimore, MD 21218-2686; *Phone:* 410-516-7106; *Fax:* 410-516-4109; *Email:* [anne@pha.jhu.edu](mailto:anne@pha.jhu.edu)

## ● The Dynamic Earth

<http://www.discoverycube.org>

Discovery Science Center is an interactive science center with over 100 hands-on exhibits augmented by educational programming and materials, providing learning opportunities for students, teachers, and family audiences. **The Dynamic Earth** program includes:

- Resource materials and kits provide the classroom teachers with a set of hands-on materials that will enable students to design and test experiments. The curriculum packet contains science content information, vocabulary list, a materials list, timeline for preparation and implementation, tips for managing the students or classroom during hands-on experiences, a bibliography of additional materials, and a collection of professional contacts.
- Teacher training program in the use of these materials and lesson plans. This six-hour training, along with the teacher's guide and kit will enable two to three weeks of classroom instruction.
- An interactive science presentation for the classroom or general public.
- Family science nights at the science center. These evenings will introduce families to the science programs presented in the schools. Families will observe science demonstrations, attend science lectures, interact with the hands-on exhibitry, such as an earthquake simulation room, an eight-foot free-standing tornado, and a kalliroscope that models the fluid dynamics of the ocean and/or the atmosphere.

Some of the concepts that Dynamic Earth participants will investigate are:

- Plate tectonics and the changing patterns of land, sea, and mountains on the Earth's surface;

- How the sun's heating of the Earth's surface drives convection within the atmosphere and oceans, producing winds and ocean currents, leading to an understanding of global weather patterns and geographical distribution of marine and terrestrial organisms; and
- Human impact on the Earth's atmosphere, and in turn how the altered atmospheric conditions affect all life on Earth.

Interested parties should contact the Education Department or Group Bookings at 714-542-2823.

**CONTACT:** Janet Yamaguchi, Vice President, Education, Discovery Science Center, 2500 North Main Street, Santa Ana, CA 92705;  
*Phone:* 714-542-2823;  
*Fax:* 714-542-2828; *Email:* [jjyamaguchi@discoverycube.org](mailto:jjyamaguchi@discoverycube.org)

## ● Forest Watch

<http://www.forestwatch.sr.unh.edu>

**Forest Watch** is an environmental education program developed and run by the Complex Systems Research Center at the University of New Hampshire (UNH). It is designed to introduce both teachers and their students to field, laboratory, and satellite data analysis methods for assessing the state-of-health of local forest stands. Forest Watch provides workshops which are designed to help K-12 teachers introduce their students to selected hands-on techniques for evaluating the health of white pine (*Pinus strobus*), a bio-indicator for tropospheric ozone damage. Through Forest Watch, students become actively involved in doing meaningful scientific research. Students and teachers set up permanent sampling plots in a forest stand and conduct several ecological and biophysical measurements using scientific protocols. Students collect and help analyze valuable data

for UNH researchers while participating in this educationally beneficial program.

Forest Watch has two main objectives: 1) to introduce teachers to techniques that allow students to assess environmental conditions of forest stands and tree species over time; and 2) to provide research scientists an opportunity to assess air pollution impacts to forested species on a regional level. In conducting ecological site assessments, students are introduced to several disciplines of science, such as botany, biology, chemistry and physics, as well as other non-scientific disciplines. Professional development workshops are offered to teachers around the New England region through hands-on activities and field work in order to achieve the project's objectives.

Now in its eleventh year, the Forest Watch program is proving that students can learn science by doing science and that student data and monitoring efforts can assist scientists to assess the impacts of changing air quality on our natural environment.

**CONTACT:** Dr. Barry Rock, Program Director, or Mr. Ryan Huntley, Program Coordinator, Complex System Research Center, Morse Hall, University of New Hampshire, Durham, NH 03824; *Phone:* 603-862-1792; *Fax:* 603-862-0188; *Email:* [forestwatch@unh.edu](mailto:forestwatch@unh.edu)

## ● The GLOBE Program

<http://www.globe.gov>

**The GLOBE Program** is a worldwide network of K-12 students guided by GLOBE-trained teachers in conducting valid Earth science observations at or near their schools. They then report their findings via the Internet to a central database. Scientists use GLOBE data in their research and provide feedback to the students to enrich their education. Maps and

graphs based on GLOBE student data are created on the Web site. This feedback provides “real life” material for student inquiry. GLOBE observations and measurements are in the following study areas: atmosphere, hydrology, land cover, soils, global positioning system (GPS), and phenology/land cover.

In the U.S., there is no cost to participate in the Program. GLOBE supplies educational materials and the interactive Web site, and educational institutions such as universities partner with GLOBE to train teachers. Schools support participation by having one or more teachers attend a GLOBE Training Workshop and make equipment available to students for taking measurements and Internet access for reporting their data. Nobel Laureate Dr. Leon Lederman said “GLOBE is the quintessentially ideal program for involving kids in science.”

Teachers and students from over 10,000 schools in over 90 countries currently participate in GLOBE. In the U.S., GLOBE is managed by an interagency team: NASA, NOAA, NSF, and EPA. Other nations administer their own programs.

**CONTACT:** Email: [info@globe.gov](mailto:info@globe.gov);  
Phone: 1-800-858-9947.

## ● ISS EarthKAM

<http://www.earthkam.ucsd.edu/>

### Earth Knowledge Acquired by Middle School Students

(EarthKAM) engages the educational community in inquiry-based learning to explore and understand planet Earth, using remotely-sensed data from the International Space Station. ISS EarthKAM has accumulated a wealth of images, taken remotely by middle school students operating an electronic still camera flown in Earth orbit. These visible-light images show a diversity of regions and physical fea-

tures, from every continent except Antarctica—all available on the educational, user-friendly, Web-based data system. Educational materials are also available online to help educators get started with the program and integrate working with images into their classrooms and curricula. EarthKAM's main objectives are to:

- facilitate collaborative, inquiry-based explorations that utilize Earth images in support of national, state, and local education standards; and
- provide technology-supported learning opportunities in science, geography, and mathematics.

Middle school educators (grades 5–8) also have the opportunity to join the EarthKAM Community; a registration form is available online. The EarthKAM Community provides additional information and support for students and educators as they explore the Earth images and take their own images from the International Space Station.

ISS EarthKAM is a collaboration among NASA; the University of California, San Diego; Texas A&M; and TERC's Center for Earth and Space Science Education.

**CONTACT:** EarthKAM Coordinator, TERC, 2067 Massachusetts Ave, Cambridge, MA 02140; Phone: 617-547-0430; Fax: 617-349-3535; Email: [EarthKAM\\_Coordinator@TERC.edu](mailto:EarthKAM_Coordinator@TERC.edu)

## ● The JASON Project

<http://www.jasonproject.org>

From the depths of the ocean to the heights of the rain forest canopy and from icy polar regions to red-hot volcanoes, **The JASON Project** takes students and teachers on an exciting educational adventure that sparks the imagination of students and enhances classroom experiences. The JASON Project is a multi-disciplinary, educa-

tional program that pairs students with leading scientists and experts as they work together to understand the dynamic systems of planet Earth.

Each year, JASON Project staff collaborates with leading scientists, educators, and students to develop year-long curricular materials modeled upon real research. The JASON Project offers a print curriculum filled with research stories, student exercises and masters, assessment tools, teacher preparation, and interdisciplinary links. Engaging video supplements complement this curriculum, highlighting key themes and modeling the work of host researchers. Team JASON Online, the JASON Project's award-winning gated online community, provides additional content, as well as interactivity and community. All of these materials:

- are fun and engaging,
- guide teachers and students through an inquiry-based learning experience,
- emphasize concepts taught in grades 4–9,
- model national educational standards, and
- correlate to each state's science, math, social studies, language arts and technology standards

NASA JASON locations include Ames Research Center, Goddard Space Flight Center, and Johnson Space Center.

Programs focus on oceans, rainforests, extreme environments, volcanoes, and exploration of inner and outer space. All programs focus on connecting students and teachers with researchers and scientists in the field.

**CONTACT:** For more information on how to get involved, visit the JASON Project on the Web at [www.jasonproject.org](http://www.jasonproject.org) or call 1-888-527-6600.

## ● **NASA Goddard Institute for Space Studies (GISS)—Institute on Climate and Planets (ICP)**

<http://icp.giss.nasa.gov>

**ICP** engages students and educators from junior high to graduate school in Earth and space science research alongside world-class scientists. ICP is **NASA GISS'** response to a national challenge to give students a fair start to become productive and responsible citizens in America's workforce and society. More than a program, ICP is a year-round research and education community that represents the country's diversity, including students, educators and researchers from NASA, Columbia University, City University of New York (CUNY), and other area colleges and New York City metro schools. It aims to help teachers connect current research to national science standards and their teaching, to give students a chance to participate in advanced science learning and workforce preparation, and to work with New York museums on climate literacy.

Through direct research experiences focusing on Earth's climate, ICP seeks to help students develop: 1) views of a world that is connected regionally and globally; 2) problem-solving skills; and 3) science understandings about the Earth system that consider science, technology, and society. A different kind of learning and research lab is evolving in the ICP where students and educators work on-site or remotely with scientists to create new knowledge that may help us better understand and predict Earth's climate. After-school research internships are available at GISS and cooperating universities. In-school, ICP faculty involves students in new or enhanced curriculum to develop climate and space science literacy. Full-time sum-

mer enrichment programs offer a more intensive research experience. In-service and pre-service teacher workshops are also conducted to share curriculum.

Several ICP spin-off programs are now available as a result of ICP faculty-scientist collaborations. These include: 1) CUNY-wide training programs to address the scientific digital divide via the University's NASA Minority University-SPace Interdisciplinary Network (MU-SPIN)/Network Resources and Training Site (NRTS); 2) research programs via the NASA New York City Space Alliance led by Medgar Evers College and the NASA Partnership for Integrating Research; 3) outdoor science education via a carbon field study in New York's Black Rock Forest; and 4) New York metro area intensive observation periods for schools to contribute to climate and health studies conducted through the GISS Urban Measurement of Aerosol and Asthma Program.

**CONTACT:** Carolyn A. Harris, ICP Director, GISS at Columbia University, 2880 Broadway at 112th Street, New York, NY 10025; *Phone:* 212-678-5653; *Fax:* 212-678-5552; *Email:* [charris@giss.nasa.gov](mailto:charris@giss.nasa.gov)

## ● **NASA Student Involvement Program (NSIP)**

<http://education.nasa.gov/nsip>

NASA's national competition for elementary-secondary students, **NSIP** is designed to link students directly with NASA's diverse and exciting missions of research, exploration, and discovery. Annual competitions foster student literacy in science, mathematics, engineering, technology, and geography. Teachers use NSIP to support curricular goals, spark student interest, encourage creative thinking across disciplines, and involve students in

science process skills. Program information and entry forms are provided in the annual NSIP Program Announcement, available in print and via the Internet prior to the new school year. Supplemental information is provided in Educator Resource Guides available for each of the competition categories. The 2001–2002 competition included the following categories: Watching Earth Change; My Planet, Earth; Design a Mission to Mars; Science and Technology Journalism; Aerospace Technology Engineering Challenge; and Space Flight Opportunities.

Entries are judged at NASA Centers; students may receive judges' comments about their entry. All qualified entrants receive NASA certificates of participation. Prizes include NASA presentations at schools, and trips to the National Symposium, Student Flight Week, and Space Camp. Beginning in 2000, the Institute for Global Environmental Strategies has awarded the \$4,000 Thacher Scholarship to a first-place, high-school Center Winner in the Watching Earth Change competition.

**CONTACT:** Visit <http://education.nasa.gov/nsip> or call 1-800-848-8429.

## ● **Odyssey of the Mind**

<http://www.odysseyofthemind.com/>

NASA is partnering with **Odyssey of the Mind** to develop and sponsor a long-term Earth science problem for their annual competition. Founded in 1978, Odyssey of the Mind is an international creative problem-solving program for students from kindergarten through college, attracting students from 49 states, the District of Columbia and over 30 countries. Odyssey of the Mind competitions involve creative exercises in which teamwork, cooperation and ingenuity are applied to complete various tasks.

Students choose from one of six long-term “problems” and form teams to develop solutions. The problems range in nature from the technical to the artistic, and solutions are judged for creativity, originality, and other criteria. In the spring, teams take their solutions to official competitions at the regional, state/country, and world level.

The NASA-sponsored problem in 2001–2002, named OMER’s Earthly Adventures after the raccoon-like Odyssey of the Mind mascot OMER, was a technical problem based on environmental preservation that also incorporated elements of theatrical performance. Students attempted to correct hypothetical environmental problems, and create the illusion of OMER traveling.

In addition to sponsoring a long-term problem, NASA has developed a Web site for Odyssey of the Mind participants, and plans to provide other support services. In May 2002, NASA scientists and engineers attended the Odyssey of the Mind’s culminating event of the year, the 2002 World Finals at the University of Colorado at Boulder, to talk with participants about educational opportunities and careers in Earth science with NASA.

**CONTACT:** Visit the Odyssey of the Mind Web site at <http://www.odyssey-ofthemind.com> for details on how to participate; or the NASA Odyssey of the Mind Web site at <http://earthobservatory.nasa.gov/odysseyofthemind>

## ● PIPELINES

[www.phys.subr.edu/pipelines](http://www.phys.subr.edu/pipelines)

The **Program to Increase the Pursuit of Education and Learning IN Engineering and Science (PIPELINES)** is a partnership between Southern University and A&M College (SUBR) in Baton Rouge and Iowa State University (ISU).

PIPELINES supports activities in Earth and environmental science for students and teachers in K–12, undergraduates, graduates and university faculty. Major components of the program are:

■ **Educational reform and support for standards-based curriculum, teaching and learning**—Both SUBR and ISU offer in-service workshops designed to promote and support standards-based education, with emphasis on science and mathematics education in general and Earth and environmental science education in particular. These workshops are for pre-college teachers and college faculty. Additionally, the SUBR College of Education’s Curriculum Center serves as a statewide repository for instructional materials and supplies for teachers in science and mathematics. The center holds regular workshops to aid teachers in preparing meaningful lessons and activities for students.

■ **Global Learning and Observations to Benefit the Environment (GLOBE)**—GLOBE, <http://www.globe.gov>, is a worldwide network of K–12 students who work under the guidance of GLOBE-trained teachers to make a core set of environmental observations at or near their schools and report their data via the Internet. The SUBR-GLOBE Partnership provides GLOBE certification training in the basic GLOBE protocols. Teacher participants receive GLOBE materials and supplies, as well as stipends for after-school, weekend, and holiday sessions.

■ **Undergraduate Research Support**—PIPELINES supports twenty high-achieving undergraduate students in science, mathematics, and engineering to conduct Earth science research at NASA Field Centers during the summer or at SUBR or ISU.

■ **Earth Science at the Timbuktu Academy (ESTA)** at SUBR is a six-

week residential program that provides intensive academic enrichment designed to enhance the academic achievements of pre-college students (i.e., ACT/SAT). Students are exposed to Earth and environmental science education and research, through GLOBE, and to career opportunities. Future college matriculation in Earth science related fields is a major objective of this activity. The Science Bound Program, at ISU, similarly engages pre-college students in academic enrichment activities.

**CONTACT:** Diola Bagayoko, Program Director; *Phone:* 225-771-2370; *Fax:* 225-771-4341; *Email:* [bagayoko@aol.com](mailto:bagayoko@aol.com)—or: Paulette Baptiste-Johnson, Program Administrator, *Phone:* 225-771-2730; *Fax:* 225-771-4341; *Email:* [pbaptistejohnson@aol.com](mailto:pbaptistejohnson@aol.com)

## ● Project SUN—Students Understanding Nature

<http://sunshine.jpl.nasa.gov>

NASA’s Genesis Mission currently sponsors **Project SUN** as part of its outreach effort to instill knowledge in students about the natural links between the Earth and sun. It is also carried out in partnership with the Astronomy and Physics Department and the College of Extended Learning, California State University, Northridge (CSUN). Project SUN is a component of the CSUN International Science Network (ISN).

Through Project SUN, secondary students all over the world are contributing to long-term, time-resolved, monitoring of both visible and UV radiation on the Earth’s surface. Data is usually transmitted to NASA’s Jet Propulsion Laboratory (JPL) via the Internet. Participating schools purchase their own equipment, total cost about \$600, not including the cost of a computer supplied by the school to

use for the data logger. Schools agree to supply NASA JPL at least two days of data per week for a full school year. The equipment can be used the other three days for individual research projects such as investigating the efficiency of different items of solar energy equipment, use of UV skin blockers, effects of enhanced UV radiation on plants, etc. It is hoped each school will integrate Project SUN as a continuing program, using the concept of a school research team, just as the school has established athletic teams.

A new aspect of Project SUN will soon be introduced. This adjunct research will be to see if any correlations can be made between changes in the solar wind and observed surface conditions.

The components of Project SUN are: 1) low cost, scientifically accurate instrumentation; 2) computer interfacing coupled with old computers such as the Apple IIE, Apple IIC, Macintosh, and old IBM compatibles used as dedicated data loggers; 3) appropriate software and curriculum; and 4) a detailed operating strategy and a system of inservice teacher training. Part of this training is via the CSUN course Physics 595s, Solar Flux Detection, which is taught over the Internet by Dr. Gilbert Yanow.

Very careful, annual re-calibration of the commercial instruments and a continuing program of instrumentation quality control done in cooperation with the manufacturers to maintain the accuracy of the data.

**CONTACT:** Gilbert Yanow, NASA Jet Propulsion Laboratory, Mail Stop 264-370, 4800 Oak Grove Dr., Pasadena, CA 91109; *Phone:* 818-354-8060, *Fax:* 818-393-1392; *Email:* gilbert.yanow@jpl.nasa.gov

## ● **Students' Cloud Observations Online (S'COOL) Project**

<http://scool.larc.nasa.gov>

**S'COOL** is a component of NASA's Clouds and the Earth's Radiant Energy System (CERES) project. The first CERES instrument was launched in late 1997 to provide global data on clouds. The 2nd and 3rd instruments were launched on the Terra spacecraft in December 1999. S'COOL Project participants make ground truth measurements for the CERES experiment. Ground truth measurements are land-based observations to compare with satellite data for the purpose of improving the satellite results.

Participating classes are asked to make basic weather observations and to record the type and features of clouds in the sky at the time that the satellite passes over their location. Observations are then either entered in an online form or emailed, faxed, or mailed to NASA for entry into an online database. Students have access to their results as well as those from other participating schools. Satellite observations for matching times will also be captured so that CERES scientists can evaluate the results and students can compare their observations to the satellite's.

Participants will receive some instructional materials, satellite overpass times, and information necessary for reporting results. There is no cost to participate.

In addition, a week-long teacher workshop is held each summer at NASA Langley Research Center, allowing participating teachers to obtain an in-depth understanding of the related scientific issues to the S'COOL.

**CONTACT:** Send an email to: [scool@larc.nasa.gov](mailto:scool@larc.nasa.gov), or write to: Attn: S'COOL, Mail Stop 420, NASA Langley Research Center, Hampton, Virginia 23681-2199 USA. The following infor-

mation is requested: name of teacher; name of school and grade/age level (minimum of 3rd grade is suggested); postal and email (if available) address; whether or not the class has Internet access; location (city, state and country, as well as latitude and longitude).

## ● **Student's Online Atmospheric Research (SOLAR)**

<http://www-sage3.larc.nasa.gov/solar>

**SOLAR** is the outreach component of NASA's Stratospheric Aerosol and Gas Experiment III (SAGE III). SAGE III will provide long-term data on the abundance and global distributions of aerosols, ozone, and other trace gases in the atmosphere, which will enable scientists to assess possible influences of human activities and natural events on the Earth's climate system and other atmospheric processes such as ozone depletion.

SOLAR outreach offers a broad range of science topics related to the Earth's atmosphere, including topics that are especially relevant to science issues addressed by SAGE III. For example, SOLAR highlights some of the major questions regarding the health of the atmosphere, such as possible influences of aerosols on global climate and atmospheric processes related to ozone depletion. SOLAR is geared toward helping teachers bring these topics into the classroom. For example, SOLAR conducts workshops and other special presentations to familiarize science teachers with these and other related topics, and with research being conducted by NASA in these areas. The focus of the workshops is to help teachers integrate these topics into their curriculum, and align the topics with learning standards. The SOLAR Web site also presents tutorial discussions on related atmospheric topics.

SOLAR emphasizes involving students in hands-on learning activities. One such activity, selected for middle and high school, helps students develop skills in working with scientific equipment and collecting, analyzing, and reporting scientific data. It involves building a sun photometer, using inexpensive components and instructions supplied by SOLAR. The students, under the guidance of their teacher, will learn to calibrate and use the instrument to measure optical thickness of the atmosphere. Their data can give a qualitative assessment of the amount of aerosol or haze in the atmosphere. This basic measurement concept is fundamentally very similar to that employed by SAGE III.

**CONTACTS:** David C. Woods, Mail Stop 475, NASA Langley Research Center, Hampton, VA 23681; *Phone:* 757-864-2672; *Fax:* 757-864-2671;

*Email:* d.c.woods@larc.nasa.gov

Susan C. Walters, Mail Stop 475, SAIC/NASA Langley Research Center, Hampton, VA 23681; *Phone:* 757-864-5879; *Fax:* 757-864-2671;

*Email:* s.c.walters@larc.nasa.gov

Susan W. Moore, Mail Stop 475, SAIC/NASA Langley Research Center, Hampton, VA 23681; *Email:* s.w.moore@larc.nasa.gov

## ● Visiting Student Enrichment Program

<http://esdcd.gsfc.nasa.gov/VSEP>

The **Visiting Student Enrichment Program (VSEP)** offers students summer employment with the Goddard Earth Sciences and Technology Center (GEST), working with NASA/Goddard Space Flight Center's (GSFC) scientists. Student projects have included simulating neural networks, preparing image analysis algorithms on supercomputers, developing computational science applications, and creating interactive Web sites.

The program is open to full-time students in computer science, the physical sciences, and mathematics.

Participants must be either U.S. citizens or foreign nationals in U.S. schools who are either permanent residents or who possess a valid F1 work visa. All selected students will be subject to a pre-employment security background check under current security guidelines. Undergraduate and graduate students must have taken courses in physical and computer sciences directly related to their areas of study. High school students will be evaluated with emphasis on their potential and related extracurricular experiences, as well as on course work. The number of positions available for high school students is limited.

In 2002, project experiences are available from June 10 to August 16, 2002 (high school students may start/stop later subject to housing availability), at GSFC in Greenbelt, MD. Students are provided opportunities to work with scientists and professionals at a world-class facility while experiencing meaningful work through a project primarily focused on computer science or the application of computers to solve problems in other sciences. VSEP also offers field trips and lectures to broaden appreciation for GSFC's mission and activities.

The program now encompasses more than seven divisions at GSFC, usually including the following related to the Earth sciences: Laboratory for Atmospheres, the Global Change Data Center, the Laboratory for Hydrospheric Processes, and the Space Data and Computing Division in the Earth Sciences Directorate.

**CONTACT:** Marilyn Mack, NASA GSFC, Code 933, Greenbelt, MD 20771; *Phone:* 301-286-4638; *Email:* marilyn.mack@gsfc.nasa.gov

## ● You Be the Scientist with Satellite Imagery in EZ/EC Communities

<http://nia.ecsu.edu/nrts/ess/ezec/ezec.html>

**You Be the Scientist with Satellite Imagery in EZ/EC Communities** is a student enrichment project for six targeted middle schools located in the economic empowerment zone communities of Portsmouth, VA and Halifax, NC. The student enrichment component is designed to support extra-curricular science activities that will increase awareness and use of GOES weather satellite data. The program is helping students meet core Earth Science learning objectives and to develop marketable skills in the area of computer technology. The You Be the Scientist program launches students into the 21st century with organized integrated science and technology educational enrichment activities.

The program also exposes students to a variety of careers available in research, data analysis, applications, and computer visualization.

Elizabeth City State University (ECSU) conducts this project, at which the NASA Minority University-SPace Interdisciplinary Network (MU-SPIN) has established a Network Resources and Training Site (NRTS). ECSU brings satellite imagery to middle schools in its region in an effort to enhance mathematics and science studies by underrepresented minority students. The program is designed to aggressively strengthen the current Earth system science outreach to EZ/EC middle schools by NASA and the ECSU-NRTS.

**CONTACT:** Dr. Linda Bailey Hayden, NASA Network Resources and Training Site, Elizabeth City State University, Box 672, 1704 Weeksville Rd., Elizabeth City, NC 27909; *Phone:* 252-335-3696; *Fax:* 252-335-3790; *Email:* lhayden@umfort.cs.ecsu.edu



## UNDERGRADUATE & GRADUATE

### ● **Center for Hydrology, Soil Climatology, and Remote Sensing's Undergraduate Summer Enrichment Program**

<http://hscars1.saes.aamu.edu>

The **Center for Hydrology, Soil Climatology, and Remote Sensing** at Alabama A&M University in Huntsville conducts an Undergraduate Summer Enrichment Program, which provides summer research opportunities for undergraduate minority and female students in Earth system science. Interns are selected from a pool of highly-qualified student applicants from across the nation. This program provides for an eight-week period of residence at Alabama A&M University, where students have the opportunity to work with a researcher/mentor from Alabama A&M or the Global Hydrology Climate Center on general research areas (e.g., micrometeorology, soil data analysis, hydrologic modeling, geographic information systems, soil hydrology, or computer science). Research papers resulting from the interns' summer projects have been presented at various national conferences. Posters describing the program are mailed in January. Applications are available on the project Web page.

**CONTACT:** Ms. Phyllis Campbell, HSCaRS, Alabama A&M University, Normal, AL 35762, *Phone:* 256-851-5076; *Email:* pcampbell@aamu.edu

### ● **Center for the Study of Terrestrial and Extraterrestrial Atmospheres (CSTEa)**

<http://cstea.howard.edu>

**CSTEa** is a NASA University Research Center (URC)—multidisciplinary

research units established at minority institutions to focus on a specific area of NASA interest. CSTEa is committed to training students in space-based and atmospheric sciences. The Center, a component of Howard University's Program in Atmospheric Sciences (HUPAS), actively engages students in CSTEa research. The Howard University Graduate School (HUGS) also offers a wide array of graduate-level courses leading to the Master of Science or Doctor of Philosophy degree. These courses are taught in the Departments of Physics, Chemistry, Mechanical and Electrical Engineering.

Students are able to work with a variety of research mentors from Howard University, NASA, and the National Oceanic and Atmospheric Administration (NOAA).

Undergraduate students receive a yearly stipend. Graduate students may qualify for tuition, fees, and stipend packages worth up to \$34,000 per year.

**CONTACT:** Demetrius Venable, Director, Center for the Study of Terrestrial and Extraterrestrial Atmospheres, Howard University, 2216 6th Street NW, Room 103, Washington, DC 20059; *Phone:* 202-806-5172; *Fax:* 202-806-4430; *Email:* dvenable@howard.edu

### ● **Curriculum Improvement Partnership Award Program (CIPA)**

<http://mured.nasaprs.com>

The **CIPA Program** provides support to two and four-year minority institutions who have received limited funding from NASA. CIPA is designed to strengthen curricula and technical programs directly related to the NASA mission. The specific objectives are to:

- increase the quality and quantity of NASA-related science, mathe-

tics, engineering, and technology curricula at nine minority institutions; and

- increase the number of minority students at the pre-college and college levels that study science, mathematics, engineering, and technology and that choose careers in NASA-related fields.

The 2002 CIPA awardees with an Earth science focus are:

#### **North Carolina Central University** *Training Incoming Students to be Scientists and Engineers (TISSE)*

Principal Investigator: Dr. Walter Harris, *Email:* wharris@wpo.nccu.edu

#### **Universidad Politecnica de Puerto Rico**

##### *Modern Physics Laboratory*

Principal Investigator: Dr. Edbertho Leal-Quiros, Ph.D., *Email:* eleal@upr.edu

#### **Cheyney University**

##### *Cheyney University's 21st Century Workforce Development*

Principal Investigator: Dr. Warren E. Gooden, *Email:* cpettus@cheyney.edu

#### **Keweenaw Bay Ojibwa**

##### *Community College*

##### *Keweenaw Bay Earth Science Diversity Initiative for Native American Students*

Principal Investigator: Treneice Marshall, *Email:* tjmarsha@mtu.edu

#### **Universidad Metropolitana**

##### *GIS and Environmental Informatics: Novel Program in Puerto Rico*

Principal Investigator: Dr. Alberto Rivera Rentas, *Email:* ac\_alrivera@suagm.edu

#### **Essex County College**

##### *Environmental Science Curriculum Development*

Principal Investigator: Dr. Jeffrey Lee, *Email:* lee@essex.edu

### **Harold Washington College—City College of Chicago**

#### ***NASA-Based Modular Chemistry: Curriculum Reform at Harold Washington College***

Principal Investigator: Dr. Thomas Higgins, *Email:* [tbhiggins@ccc.edu](mailto:tbhiggins@ccc.edu)

### **San Jacinto College North**

#### ***Expanding and Developing NASA-Related Curriculum in the Gulf Coast Colleges***

Principal Investigator: Dr. Sarah Percy Janes, *Email:* [sjanes@sjcd.cc.tx.us](mailto:sjanes@sjcd.cc.tx.us)

### **Wiley College**

#### ***The Wiley College Computer-Based Mathematics Center and the Science Academy for Kids***

Principal Investigator: Mrs. Sarah Bush, *Email:* [sbush@wileyc.edu](mailto:sbush@wileyc.edu)

**CONTACT:** CIPA is a program of NASA's Minority University Research and Education (MURED) program. It is administered by United Negro College Fund Special Programs (UNCFSP). For further information contact Aaron Andrews at 703-205-7640 or visit the UNCFSP Web site at <http://www.uncfsp.org>

## ● **Earth System Science Fellowship Program**

[http://research.hq.nasa.gov/code\\_y/code\\_y.cfm](http://research.hq.nasa.gov/code_y/code_y.cfm)

NASA offers graduate student training fellowships for persons pursuing a Master of Science (M.Sc.) or Doctoral (Ph.D.) degree in Earth system science. The purpose of these fellowships is to ensure continued training of interdisciplinary scientists to support the study of the Earth as a system.

Applications to the Earth System Science Fellowship Program will be considered for research in the following areas:

- Biology and Biogeochemistry of Ecosystems, and their role in the Earth system, and the Global Carbon Cycle

- Atmospheric Chemistry, Aerosols, and Solar Radiation
- Global Water and Energy Cycle
- Oceans and Ice in the Earth System
- Solid Earth Science

Research will also be considered in atmospheric chemistry and physics, ocean biology and physics, ecosystem dynamics, hydrology, cryospheric processes, geology, geophysics, and information science and engineering, provided that it is relevant to NASA's program in support of the U.S. Global Change Research Program (USGCRP). NASA discourages submission of paleo-climate related applications to this program. Additional information about the Earth Science Enterprise—e.g., its scientific priorities, research strategy, and recent accomplishments—can be found at <http://www.earth.nasa.gov>

Students admitted or enrolled in a full-time M.Sc. and/or Ph.D. program at accredited U.S. universities are eligible to apply. The deadline for application is March 15 of each year; the results are announced by June 30, with an anticipated award date of September 1 of the same year.

Awards are made initially for one year and may be renewed annually, no more than two additional years for a total of three years, based on satisfactory progress. The amount of the award is \$24,000/annum, which may be used to defray student's stipend, living and educational expenses, travel expenses to scientific conferences, tuition, and fees.

Note that additional Earth Science research opportunities are available at NASA Field Centers through the GSRP. A student may apply to both the ESS Fellowship Program and the GSRP (see separate entry and note different schedule). Those GSRP applications that check both "HQ" and "Earth Science" are grouped with the applica-

tions to the ESS Fellowship Program for evaluation and selection.

**CONTACT:** Earth System Science Fellowship Program, Code Y, NASA Headquarters, Washington, DC 20546; *Phone:* 202-358-0855; *Email:* [acrouch@hq.nasa.gov](mailto:acrouch@hq.nasa.gov)

## ● **Goddard Space Flight Center/Howard University Fellowship in Atmospheric Science (GoHFAS)**

GoHFAS is a partnership between Howard University and GSFC's Laboratory for Atmospheres. The overall goal of GoHFAS is to facilitate the transition from undergraduate to graduate school by exposing students to solving open-ended problems and conducting research. This is accomplished through year-long interaction between students and mentors from participating organizations, including an eight-week summer program and travel back to the research site during the students' winter break to continue work on their projects. The ultimate goal is to increase the number of underrepresented minorities in the atmospheric sciences. Participants are juniors at U.S. universities with majors in the physical sciences and emphasizing: atmospheric science, chemistry, physics, or related engineering disciplines. Students must have a minimum of one year of college-level calculus and physics or chemistry.

**CONTACT:** Sonya T. Smith, Howard University; *Phone:* 202-806-4837; *Email:* [ssmith@howard.edu](mailto:ssmith@howard.edu)

## ● Graduate Student Summer Program in Earth System Science

<http://www.umbc.edu/gest/studentop/summer.html>

The Goddard Space Flight Center's Earth Sciences Directorate, in collaboration with the Goddard Earth Sciences and Technology (GEST) Center with headquarters at the University of Maryland Baltimore County, is offering a limited number of graduate student research opportunities for the summer of 2002. The program is scheduled for June 10 to August 16, 2002. The program is designed to stimulate interest in interdisciplinary Earth science studies by enabling selected students to pursue specially tailored research projects in conjunction with Goddard scientific mentors. This year's theme is the Global Water Cycle and Climate Change.

Each student will be teamed with a NASA scientist mentor with parallel scientific interests to jointly develop and carry out an intensive research project at GSFC over the ten-week period. NASA mentors will be drawn from the four participating Earth Science laboratories at Goddard: The Laboratory for Atmospheres, The Goddard Institute for Space Studies, The Laboratory for Hydrospheric Processes, and The Laboratory for Terrestrial Physics. Students will be expected to produce final oral and written reports on their summer research activities.

The program is open to students enrolled in or accepted to accredited U.S. graduate programs in the Earth, physical or biological sciences, mathematics, or engineering disciplines. Preference will be given to students who have completed at least one year of graduate study. Minorities and women are encouraged to apply.

Participants must be either U.S. citizens or foreign nationals in U.S. schools who are either permanent residents or who possess a valid F1 visa. All selected students will be subject to a pre-employment security background check under the current security guidelines. Applications for the 2002 program are due February 15, 2002. Selection announcements will be made before April 5, 2002.

**CONTACT:** L. Anathe Brooks, Acting Associate Director, GEST Center, Mail Code 900.1, NASA Goddard Space Flight Center, Greenbelt, MD 20771; *Phone:* (301) 286-4099; *Email:* abrooks@research.umbc.edu

## ● NASA Academy

<http://www.nasa-academy.nasa.gov>

NASA's charter gives it the main role of using and exploring space for the benefit of humankind. The success of the space program results from the interaction of government, academia, and the private sector, each playing a critical and different role. Responsibilities overlap, leaders migrate from one sector to another, and interdependence changes with each new administration. The **NASA Academy** is a unique institute of higher learning whose goal is to help guide future leaders of our space program by giving them a glimpse of how this system works.

The program's intent is to give participating students a working knowledge of NASA and its programs. The Academy accomplishes this through interactive sessions with leaders within government, industry, and academia and research in NASA's laboratories. The students will discover how NASA and its Field Centers operate, understand the NASA link to the private sector, gain experience in world-class laboratories, participate in a

team environment where people work together to accomplish common goals, and build professional bonds among our future leaders.

The NASA Academy was initially started in 1993 at Goddard Space Flight Center (GSFC). NASA Academies are currently active at GSFC and Ames Research Center.

Student eligibility requirements include:

- a demonstrated interest in the space program;
- enrollment (as of June 1 of the program year) as a junior, senior, or early graduate student;
- a minimum B average;
- a major in science (physics, chemistry, biology, etc.), mathematics, engineering, computer science, or other area of interest to the space program; and
- citizenship or permanent residence (as of June 1 of the program year).

The NASA Academy is co-sponsored by the National Space Grant College and Fellowship Program, which provides students with stipends between \$3,000 and \$4,000 for the summer. Housing, meals, and local transportation are paid for by the participating NASA Center. The deadline for filing applications for the 2002 NASA Academy is January 31, 2002.

**CONTACT:** For application materials, please check the NASA Academy Home Page: <http://www.nasa-academy.nasa.gov>, your local Space Grant College Consortia Office: <http://cal-space.ucsd.edu/spacegrant>, or call the University Programs Office, NASA GSFC, at 301-286-0904.

## ● **NASA Goddard Institute for Space Studies (GISS)—Institute on Climate and Planets (ICP)**

<http://icp.giss.nasa.gov>

ICP engages students and educators from junior high to graduate school in Earth and space science research alongside world-class scientists. ICP is NASA GISS' response to a national challenge to give students a fair start to become productive and responsible citizens in America's workforce and society. More than a program, ICP is a year-round research and education community that represents the country's diversity, including students, educators and researchers from NASA, Columbia University, City University of New York (CUNY), and other area colleges and New York City metro schools. It aims to help teachers connect current research to national science standards and their teaching, to give students a chance to participate in advanced science learning and workforce preparation, and to work with New York museums on climate literacy.

Through direct research experiences focusing on Earth's climate, ICP seeks to help students develop: 1) views of a world that is connected regionally and globally; 2) problem-solving skills; and 3) science understandings about the Earth system that consider science, technology, and society. A different kind of learning and research lab is evolving in the ICP where students and educators work on-site or remotely with scientists to create new knowledge that may help us better understand and predict Earth's climate. After-school research internships are available at GISS and cooperating universities. In-school, ICP faculty involves students in new or enhanced curriculum to develop climate and space science literacy. Full-time sum-

mer enrichment programs offer a more intensive research experience. In-service and pre-service teacher workshops are also conducted to share curriculum.

Several ICP spin-off programs are now available as a result of ICP faculty-scientist collaborations. These include: 1) CUNY-wide training programs to address the scientific digital divide via the University's NASA Minority University-SPace Interdisciplinary Network (MU-SPIN)/Network Resources and Training Site (NRTS); 2) research programs via the NASA New York City Space Alliance led by Medgar Evers College and the NASA Partnership for Integrating Research; 3) outdoor science education via a carbon field study in New York's Black Rock Forest; and 4) New York metro area intensive observation periods for schools to contribute to climate and health studies conducted through the GISS Urban Measurement of Aerosol and Asthma Program.

**CONTACT:** Carolyn A. Harris, ICP Director, GISS at Columbia University, 2880 Broadway at 112th Street, New York, NY 10025; *Phone:* 212-678-5653; *Fax:* 212-678-5552; *Email:* [charris@giss.nasa.gov](mailto:charris@giss.nasa.gov)

## ● **NASA Graduate Student Researchers Program (GSRP)**

<http://education.nasa.gov/gsrp>

GSRP awards fellowships for graduate study leading to research-based masters or doctoral degrees in the fields of science, mathematics, and engineering. Earth science research opportunities are available at NASA Centers, including: Ames Research Center, Goddard Space Flight Center, Jet Propulsion Laboratory, Langley Research Center, Marshall Space Flight Center, and Stennis Space Center. Full

descriptions of research areas that will be supported are provided on the GSRP Web site. Note that the GSRP also supports the Earth System Science Fellowship Program (see separate entry) with NASA Headquarters.

Fellowships are awarded for one year as training grants not to exceed \$24,000 and are renewable for a total of three years based on satisfactory academic advancement, research progress, and available funding. All applicants must be either currently enrolled as full-time graduate students in an accredited U.S. college or university or making plans to enroll as a full-time student. Applicants must be citizens of the U.S. and may apply to the program prior to receiving their baccalaureate degrees or any time during their graduate work. Students who apply prior to acceptance in graduate school must submit a list of prospective schools, and if selected, must provide proof of acceptance prior to an award. All applicants must have a faculty advisor or graduate department chair sponsor. An individual accepting this award may not concurrently receive other Federal fellowships or traineeships.

**CONTACT:** Visit the GSRP Web site at: <http://education.nasa.gov/gsrp> for details about research areas that are supported, eligibility, proposal submission, and application process.

## ● **NASA Summer School for High Performance Computational Earth and Space Sciences**

<http://www.umbc.edu/gest/studentop/nasa.html>

The NASA Goddard Space Flight Center's (GSFC) Earth and Space Data Computing Division (ESDCD) and the Goddard Earth Sciences and Technology Center (GEST) conduct an intensive summer lecture series in

computational Earth and space sciences for graduate students. The ESDCD provides comprehensive research and development support in data handling and computing for NASA Earth and space science research programs. Resident facilities include a 416-processor Compaq (current acquisition), a 1360-processor Cray T3E, a 512-processor SGI Origin 3000, numerous middle-sized supercomputing platforms, and several Beowulf-class systems. Beowulf is a class of inexpensive massively-parallel systems designed as a cluster of commodity PCs using LINUX, first conceived at GSFC in the 90s.

Approximately 15 students will be selected to participate in the three-week program. Students will be given hands-on computer training and small group interaction experience. Staff and invited computational scientists will present a series of lectures on advanced topics in computational Earth and space sciences, with emphasis on computational fluid dynamics and particle methods. Lectures will be presented on developing software for massively parallel architectures. Students are encouraged to give a presentation of their thesis research interests during the course of the summer school.

The program aims to attract Ph.D. students in the Earth and space science disciplines whose present or future research requires large-scale numerical modeling on massively parallel architectures. Eligibility is limited to those Earth and space science students who are U.S. citizens, are enrolled in U.S. universities, and have passed their Ph.D. qualifying exams. Participants receive a stipend, housing, and will be reimbursed for domestic transportation to and from Greenbelt, Maryland.

The 2002 program will be held July 8–26. Application materials received

before February 18, 2002 will receive full consideration. See the project Web site for details on how to apply.

**CONTACT:** L. Anathe Brooks, Acting Associate Director, GEST Center, Mail Code 900.1, NASA Goddard Space Flight Center, Greenbelt, MD 20771; *Phone:* 301-286-4099; *Email:* abrooks@research.umbc.edu

### ● **NASA Undergraduate Student Research Program (USRP)**

<http://education.nasa.gov/usrp>

NASA sponsors the **NASA Undergraduate Student Research Program (USRP)**, offering undergraduates across the United States mentored research experiences at NASA Centers. Two sessions will be offered in 2002: 10 weeks during Summer 2002 and 15 weeks during Fall 2002.

Applicants must be rising juniors or seniors during the Spring 2002 semester/quarter, enrolled full-time in an accredited U.S. college or university. Eligible fields of study are an academic major or demonstrated coursework concentration in Earth sciences, engineering, mathematics, computer science, or physical/life sciences. Research areas supported by USRP vary among NASA Centers; please see the USRP Web site for details.

The NASA-USRP consists of a 10–15 week research experience at a participating NASA Center under the supervision of a NASA technical mentor. Selected students must be available to work 10 consecutive weeks at 40 hrs. per week during the Summer 2002 session (dates to be determined by Centers between late May 2002 and mid-Aug. 2002) or 15 consecutive weeks at 40 hrs. per week during the Fall 2002 session (dates to be determined by Centers between mid-Aug. 2002 and mid-Dec. 2002).

Students will receive a \$5,000 (summer session) or \$7,500 (fall session) stipend for the research experience plus one round-trip airfare or ground transportation costs to and from the NASA Host Center. A housing allowance will be provided for students at specific high cost NASA Centers. At the completion of the research session, students must submit a paper on their NASA-USRP research experience. Students may also be asked to discuss their research in public forums and/or participate in NASA-sponsored colloquia, workshops, and technology demonstrations.

**CONTACT:** See <http://education.nasa.gov/usrp> for details about research areas that are supported, eligibility, proposal submission, and application process.

### ● **National Space Grant College and Fellowship Program (NSGCFP)**

<http://www.hq.nasa.gov/spacegrant>

**NSGCFP** funds support graduate and undergraduate students throughout the 50 states, District of Columbia, and Puerto Rico. The criteria (recruitment and selection) are at the discretion of the consortia. However, all must be U.S. citizens and enrolled full-time in a degree program related to aerospace which includes aeronautics, Earth and space science, space engineering, and related fields.

Designated Space Grant institutions provide specialized training and education programs to help maintain the United States' capabilities in aerospace science and technology and education, and to capitalize on the multiple opportunities afforded by the space environment. Each state consortium is challenged to establish a national network of universities with interests and capabilities in aeronautics, space, and related fields; to encourage coopera-

tive programs among universities, aerospace industry, and federal, state, and local governments; to encourage interdisciplinary training, research, and public service programs related to aerospace; to recruit and train professionals, especially women, underrepresented populations, and persons with disabilities, for careers in aerospace science and technology; and to promote a strong science, mathematics, and technology education base from elementary through secondary levels.

**CONTACT:** See <http://www.hq.nasa.gov/spacegrant> to connect to the NASA Space Grant institution in your state.

### ● **PACES Scholars**

<http://nasa.utep.edu/pacesscholars/index.html>

**PACES Scholars** is a student enrichment program at the University of Texas at El Paso. It is part of the Pan American Center for Earth and Environmental Studies (PACES), one of NASA's University Research Centers—multidisciplinary research units established at minority institutions to focus on a specific area of NASA interest. The PACES Scholars program emphasizes monthly seminars on Earth and space science, graduate school, and internship opportunities. Not only is there an all-expenses paid field trip to a NASA facility, but students also receive a stipend.

PACES Scholars is open to juniors at UTEP in Electrical and Computer Engineering and Computer Science. You must be a U.S. citizen to apply.

**CONTACT:** Dr. Scott Starks or Ms. Michelle Kistenmacher, PACES, University of Texas at El Paso, El Paso, Texas; *Email:* michsmi@utep.edu

### ● **Partnership Awards for the Integration of Research into Undergraduate Education (PAIR)**

<http://mured.nasaprs.com>

The purpose of the **PAIR** program is to integrate cutting-edge NASA-related research into the undergraduate educational experience, to strengthen teaching and research strategies across academic programs, and to enhance collaboration among mathematics, science, engineering, and technology (MSET) academic departments, thereby strengthening the MSET baccalaureate degree-producing capacity of a number of the nation's Historically Black Colleges and Universities and Other Minority Institutions (OMIs), which include Hispanic Serving Institutions (HSIs) and Tribal Colleges and Universities (TCUs). The PAIR program provides an opportunity for these institutions to build upon their NASA-sponsored and NASA-related research across academic disciplines by creating innovative approaches to the interdisciplinary study of MSET.

The cross-disciplinary partnership spans more than one MSET academic program, creating a collaborative effort among different MSET departments. Other partners may include NASA Centers and the Jet Propulsion Laboratory (JPL) and other institutions of higher education and the aerospace community, having substantial involvement in NASA's mission to strengthen the MSET academic infrastructure of minority institutions.

PAIR Awards with an Earth Science Focus are:

**Clark Atlanta University**  
*Integration of research and Education in the Area of Earth Systems Science*

Dr. C. Williams, *Email:* cwilliams@cau.edu

**City University of New York City College**  
*Integration of Research and Education in Remote Sensing and Environmental/Climate Studies*

Dr. R. Khanbilvardi, *Email:* rk@ce-mail.engr.cuny.cuny.edu

**Hampton University**  
*The center for Lidar and Atmospheric Sciences Students (CLASS)*

Dr. D. Temple, *Email:* doyle.temple@hamptonu.edu

**University of Puerto Rico at Mayaguez**

*Partnership for Spatial and Computational Research*

Dr. L. Morell, *Email:* Lueny@ece.uprm.edu

**California State University at Northridge**

*Analyzing Data Sets*

Dr. C. Shubin, *Email:* carol.Shubin@csun.edu

**Norfolk State University**  
*Mission Leveraged Education: NSU-NASA Innovative Undergraduate Model*

Dr. W. Rodriguez,  
*Email:* wjrodriguez@nsu.edu

**CONTACT:** Mabel Jones Matthews, Office of Equal Opportunity Programs, NASA Headquarters, Code E, Washington, DC 20546-0001; *Email:* mmatthew@hq.nasa.gov.

### ● **PIPELINES**

[www.phys.subr.edu/pipelines](http://www.phys.subr.edu/pipelines)

**The Program to Increase the Pursuit of Education and Learning IN Engineering and Science (PIPELINES)**

is a partnership between Southern University and A&M College (SUBR) in Baton Rouge and Iowa State University (ISU). PIPELINES supports activities in Earth and environmental science for students and teachers in K-12, undergraduates, graduates and university faculty. Major components of the program are:

■ **Educational reform and support for standards-based curriculum, teaching, and learning**—Both SUBR and ISU offer in-service workshops designed to promote and support standards-based education, with emphasis on science and mathematics education in general and Earth and environmental science education in particular. These workshops are for pre-college teachers and college faculty. Additionally, the SUBR College of Education's Curriculum Center serves as a statewide repository for instructional materials and supplies for teachers in science and mathematics. The center holds regular workshops to aid teachers in preparing meaningful lessons and activities for students.

■ **Global Learning and Observations to Benefit the Environment (GLOBE)**—GLOBE, <http://www.globe.gov>, is a worldwide network of K–12 students who work under the guidance of GLOBE-trained teachers to make a core set of environmental observations at or near their schools and report their data via the Internet. The SUBR-GLOBE Partnership provides GLOBE certification training in the basic GLOBE protocols. Teacher participants receive GLOBE materials and supplies, as well as stipends for after-school, weekend, and holiday sessions.

■ **Undergraduate Research Support**—PIPELINES supports twenty high-achieving undergraduate students in science, mathematics, and engineering to conduct Earth science research at NASA Field Centers during the summer or at SUBR or ISU.

■ **Earth Science at the Timbuktu Academy (ESTA)** at SUBR is a six-week residential program that provides intensive academic enrichment designed to enhance the academic achievements of pre-college students (i.e., ACT/SAT). Students are exposed to Earth and environmental science education and research, through

GLOBE, and to career opportunities. Future college matriculation in Earth Science related fields is a major objective of this activity. The Science Bound Program, at ISU, similarly engages pre-college students in academic enrichment activities.

**CONTACT:** Diola Bagayoko, Program Director; *Phone:* 225-771-2370; *Fax:* 225-771-4341; *Email:* bagayoko@aol.com—or: Paulette Baptiste-Johnson, Program Administrator, *Phone:* 225-771-2730; *Fax:* 225-771-4341; *Email:* pbaptistejohnson@aol.com

### ● Remote Sensing of Tribal Lands

Salish Kootenai College is providing research experiences in Earth system science to Native American undergraduate students. A new upper division course **Remote Sensing of Tribal Lands** has been developed within the SKC B.S. in Environmental Science degree program. This course covers the application of remote-sensing technologies to the study of the Earth as a system and focuses in particular on the place of Montana tribal lands in the Earth system. Fifteen students per year are gaining introductory research experience in this class by completing a term research project that utilizes remote sensing, geographic information systems, and global positioning system technologies.

Six undergraduate research internships are also provided each year, which focus on applying remote-sensing data and Earth system modeling to the solution of important environmental problems on tribal lands. These students work under the supervision of SKC researchers. The project Web site publicizes the educational opportunities in Earth system science at Salish Kootenai College, disseminates student research results and NASA Earth Observing System data products covering Native lands, and

emphasizes the importance of NASA's Earth Science Enterprise to Native peoples.

**CONTACT:** Tim Olson, Salish Kootenai College, PO Box 117, Pablo, MT 59855; *Phone:* 406-675-4800, ext. 305; *Fax:* 406-675-4801; *Email:* tim\_olson@skc.edu

### ● STEP Careers in Research Exploration Program

The purpose of this project is to expose the Montana Tech **STEP** students (**Succeeding sTudents in Engineering Programs**) to remote sensing and to spark their interest in research-based careers. STEP is a support program that works with traditionally underrepresented students to encourage them to succeed in earning an engineering education and becoming a successful professional. Each year the STEP program accepts twenty recent high-school graduates into the program. They attend classes and academic excellence workshops for six weeks in the summer while living on campus. The classes include but are not limited to, college success, introduction to engineering, and English composition. Starting summer 2000, an additional class is being offered in the field of remote sensing. The majority of the class time is spent conducting research with faculty members who are currently doing NASA research at Montana Tech.

Upon completing the six-week summer program, all STEP students enroll at Montana Tech in one of the seven engineering programs offered. STEP works with students to develop academic and personal success strategies from college entrance until maturation and placement. Along with other STEP program requirements, students will write reports about their remote-sensing research experience and the careers that the experience may lead to, supported by a plan for reaching

the career goal(s). The STEP program then tracks student's success at following their career goal plan and assists them in attaining their goals.

The objectives of the STEP Careers in Research Exploration Program are to:

- enhance the knowledge of remote sensing and Earth system science of STEP participants through research;
- develop students' ability to conduct scientific research;
- encourage students to pursue an education in engineering or technology;
- improve tribal technology, science, and mathematics education by providing positive Native American role models to high school students; and
- expose students to the career opportunities available in the fields of remote sensing and Earth system science.

**CONTACT:** Dr. Thomas S. Moon, Professor, Geophysical Engineering, Montana Tech of the University of Montana, 1300 West Park Street, Butte, MT 59701; *Phone:* 406-496-4350; *Fax:* 406-496-4704; *Email:* tmoon@mtech.edu—or: STEP Program Director, Amy Verlanic, Technical Outreach Department, STEP Program, Montana Tech of the University of Montana, 1300 West Park Street, Butte, MT 59701; *Phone:* 406-496-4289; *Fax:* 406-496-4696; *Email:* averlanic@mtech.edu

- **Summer Institute on Atmospheric and Hydrospheric Sciences**  
[http://neptune.gsfc.nasa.gov/~fj2pg/sum\\_inst.html](http://neptune.gsfc.nasa.gov/~fj2pg/sum_inst.html)

NASA's Goddard Space Flight Center (GSFC) convenes an annual summer institute for undergraduate students, which focuses on atmospheric and hydrospheric sciences. The first part

of the program is a one-week series of lectures describing proposed areas of research in the basic areas of atmospheric and hydrospheric sciences, and is given primarily by GSFC scientists. Based on these lectures and perceived compatibilities, the students each select their mentor and desired area of research, which is negotiable. The next nine weeks are devoted to an intensive research project with their selected mentor. Students are required to present their results orally at a closing symposium, and in a written report.

The program is directed at undergraduates, majoring in one of the physical sciences, who are in their junior year at the time of application. However, all undergraduates are eligible to apply. No previous experience in atmospheric or hydrospheric sciences is needed.

There is no formal application form for this project. Applications should be submitted in the form of a letter containing the following information: 1) full name; 2) address and phone number at school; 3) permanent address and phone number at which you can always be reached; 4) current grade level; 5) current grade point average; 6) major field; 7) Social Security Number; 8) one-page type-written statement of your professional goals and interests; 9) description of computer programming and laboratory experience, if any; 10) citizenship; 11) transcripts of any courses and grades; and 12) the names of two faculty members who know your work well and have been asked to provide letter of reference. The transcripts and letters of reference should be sent directly by the university and faculty members to the address below.

The deadline for receipt of applications is in February, with awards announced in March. All applications receive consideration, without regard to race, color, age, national or ethnic origin, or sex.

**CONTACT:** Per Gloersen, NASA Goddard Space Flight Center, Code 971, Greenbelt, MD 20771; *Phone:* 301-614-5710; *Fax:* 301-614-5644; *Email:* per.gloersen@gsfc.nasa.gov

## ● Undergraduate Student Awards for Research (USAR)

NASA, through the Office of Equal Opportunity Programs, Minority University Research and Education Division (MURED), provides funding to a limited number of academic institutions for tuition assistance or fellowships for students who are U. S. citizens enrolled in selected science and engineering courses of study. The program goals include: recruitment, retention, and development of students at the beginning of their undergraduate studies to career paths in areas of science or engineering relevant to NASA's missions. This need-based program provides up to 50% (75% for student's eligible for the Pell Grant), but not more than \$7,000, to defray educational costs. The award also provides \$4,000 for a required summer research experience. Participating universities can be found on the NASA MURED Website.

**CONTACT:** Visit <http://mured.nasaprs.com> and click on *Awards—3rd Party Awards—USAR*; or *Phone:* 202-358-1347.

## ● Visiting Student Enrichment Program

<http://esdcd.gsfc.nasa.gov/VSEP>

The **Visiting Student Enrichment Program (VSEP)** offers students summer employment with the Goddard Earth Sciences and Technology Center (GEST), working with NASA/Goddard Space Flight Center's (GSFC) scientists. Student projects have included simulating neural networks, preparing image analysis algorithms on supercomput-



ers, developing computational science applications, and creating interactive Web sites.

The program is open to full-time students in computer science, the physical sciences, and mathematics. Participants must be either U.S. citizens or foreign nationals in U.S. schools who are either permanent residents or who possess a valid F1 work visa. All selected students will be subject to a pre-employment security background check under current security guidelines. Undergraduate and graduate students must have taken courses in physical and computer sciences directly related to their areas of study. High school students will be evaluated with emphasis on their potential and related extracurricular experiences, as well as on course work. The number of positions available for high school students is limited.

In 2002, project experiences are available from June 10 to August 16, 2002 (High school students may start/stop later subject to housing availability), at GSFC in Greenbelt, MD. Students are provided opportunities to work with scientists and professionals at a world-class facility while experiencing meaningful work through a project primarily focused on computer science or the application of computers to solve problems in other sciences. VSEP also offers field trips and lectures to broaden appreciation for GSFC's mission and activities.

The program now encompasses more than seven divisions at GSFC, usually including the following related to the Earth sciences: Laboratory for Atmospheres, the Global Change Data Center, the Laboratory for Hydrospheric Processes, and the Space Data and Computing Division in the Earth Sciences Directorate.

**CONTACT:** Contact: Marilyn Mack, NASA GSFC, Code 933, Greenbelt, MD 20771; *Phone:* 301-286-4638; *Email:* marilyn.mack@gsfc.nasa.gov

## POSTDOCTORATE

### ● National Research Council (NRC) Resident Research Associateship (RRA) Programs

<http://www.national-academies.org/rap>

The **NRC** conducts a national competition to recommend and make awards to outstanding scientists and engineers at recent postdoctoral and experienced senior levels for tenure as guest researchers at participating NASA laboratories. Recent postdoctoral graduates are provided with an opportunity for concentrated research in association with selected members of the permanent professional laboratory staff, often as a climax to formal career preparation. Recent doctoral recipients as well as experienced Ph.D. scientists and engineers are afforded an opportunity for research without the interruptions and distractions of permanent career positions. National Research Council administers the **RRA** program.

This program is open to all Ph.D.s, or equivalent, in science and engineering disciplines relevant to NASA research programs, including NASA's Earth Science Enterprise. As many as 200 NRC-NASA Associates are on tenure annually across all NASA Strategic Enterprises and Field Centers. All opportunities for research at NASA Centers are open to U.S. citizens and U.S. legal permanent residents; many of the opportunities are also open to other non-U.S. citizens.

Applicants must submit a research proposal that responds to a specific research opportunity at the desired NASA Center. These research opportunities are published annually in brochures for each Center and on the Internet at [www.national-academies.org/rap](http://www.national-academies.org/rap). Awardees must hold a Ph.D., Sc.D., or other earned research doctoral degree recognized in U.S. academic circles as equivalent to the Ph.D., or must submit acceptable evidence of completion of all formal academic requirements for one of these degrees before tenure may begin. Applications, submitted directly to the NRC, are accepted on a continuous basis. The following is the general schedule for this program:

■ **Applications postmarked by:**  
**April 15—**

**Will be reviewed in: late June**

■ **Applications postmarked by:**  
**August 15—**

**Will be reviewed in: late October**

■ **Applications postmarked by:**  
**January 15—**

**Will be reviewed in: late February**

**CONTACT:** National Research Council, Associateship Programs—TJ 2114, 2101 Constitution Avenue, NW, Washington, DC 20418;  
*Fax:* 202-334-2759.